SB761
U7N63
1969

FOREST DISEASE CONDITIONS IN THE NORTHERN REGION 1969

GWP

U. S. DEPARTMENT OF AGRICULTURE — FOREST SERVICE

DIVISION OF STATE AND PRIVATE FORESTRY

MISSOULA, MONTANA 1380 (3000)

LIBRARY

MAY 11 1970

ROCKY MOUNTAIN STATION

FOREST DISEASE CONDITIONS IN THE NORTHERN REGION
1969

Cover: Artificially inoculating a young western larch tree with a fungus suspected to be a cause of larch canker disease. Fungus mycelium is introduced aseptically into the tree. The wound is then closed and sealed with grafting wax. After a 2-year period, the tree will be evaluated for canker development.

FOREST DISEASE CONDITIONS IN THE NORTHERN REGION
1969

By

Clinton E. Carlson, Plant Pathologist
Forest Insect and Disease Branch

SUMMARY

Wilting of conifer seedling nursery stock was extensive in the regional nursery at Coeur d'Alene, Idaho. Two soil fungi, Fusarium oxysporum and Verticillium sp., were the causal agents. A considerable amount of effort was expended in the treatment of dwarf mistletoe-infected timber stands. Cytospora abietis and Phomopsis pseudotsugae caused considerable damage on 10- to 30-year-old western larch. Needle cast diseases including Rhabdocline pseudotsugae on Douglas-fir, Elytroderma deformans on ponderosa pine, and Hendersonia pinicola and Hypodermella concolor on lodgepole pine decreased in intensity and were considered enphytotic. Hypodermella laricis also decreased. Extensive physiological damage was caused by winter drying early in 1969. White pine blister rust (Cronartium ribicola) continued its destruction of western white pine. Preliminary analyses of conifer needle tissue in the Columbia Falls, Montana, area indicate a nearby aluminum reduction plant may be causing extensive damage to many types of vegetation. A very large root rot center was found near the Swan-Seeley divide on the Flathead National Forest.

NURSERY DISEASES

During late summer and early fall of 1969, personnel at the Coeur d'Alene Forest nursery detected wilted seedlings in western larch, Douglas-fir and spruce beds. Samples of diseased and "healthy" seedlings were sent to the forest pathology lab in Region 1 at Missoula, Montana. Two fungi, Fusarium oxysporum and Verticillium sp., were consistently isolated from diseased and "healthy" seedlings, indicating the disease is widespread through the soil at the nursery. Outplanting of infested stock could result in very poor survival.

DWARF MISTLETOES

A total of 1,285 acres of forest land were treated for protection from three species of dwarf mistletoe during the first half of fiscal year 1970, including 78 acres on the Colville National Forest, 200 on the Deerlodge, 397 on the Flathead, 422 on the Gallatin, and 188 on the Lewis and Clark. Of the total, 232 acres were treated with P&M funds,

817 with K-V funds, and 236 with Pest Control funds. Dwarf mistletoes, although very slow to spread, continue to be one of the major causes of growth reduction on forest trees in this Region. Limber pine dwarf mistletoe, Arceuthobium campylopodum f. cyanocarpum, was found for the first time on the Crow Indian Reservation at the northern end of the Big Horn Mountains and in the Pryor Mountains of eastern Montana.

CANKER DISEASES

"Carrot top" of western larch previously thought to be caused nearly exclusively by Phomopsis pseudotsugae, was found to be primarily caused by Cytospora abietis. The disease is widespread throughout the western larch type in Region 1, and exists as a serious disease in areas of high rainfall. Cytospora abietis also causes cankers on Douglas-fir and true firs, but the severity of damage has not been investigated.

A species of Aureobasidium was isolated from cankers on a ponderosa pine plantation on State land near St. Maries, Idaho. The disease was definitely associated with animal chewing on the stems, and was not widespread.

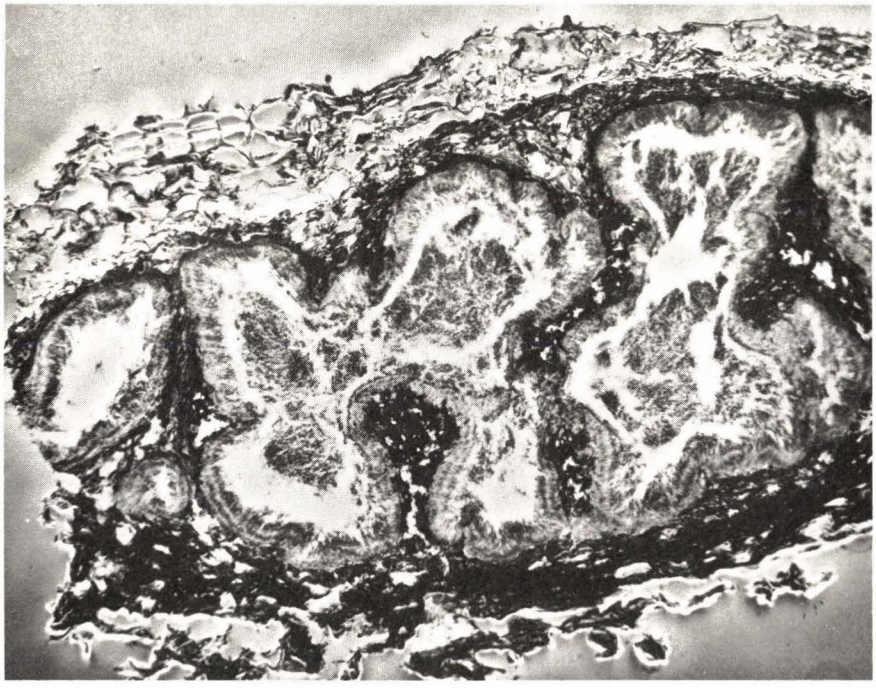

Figure 1.--Cross-section through a fruiting body of Cytospora abietis, a fungus causing cankers on western larch and Douglas-fir (X350). This fruiting body, more appropriately named a loculate pycnidial stroma, produces many millions of spores, and each spore has the potential of causing a new infection of different trees.

NEEDLE CAST DISEASES

Rhabdocline pseudotsugae was found occasionally over the Douglas-fir type. The most severe damage was restricted to Douglas-fir Christmas tree plantations near Plains, Montana.

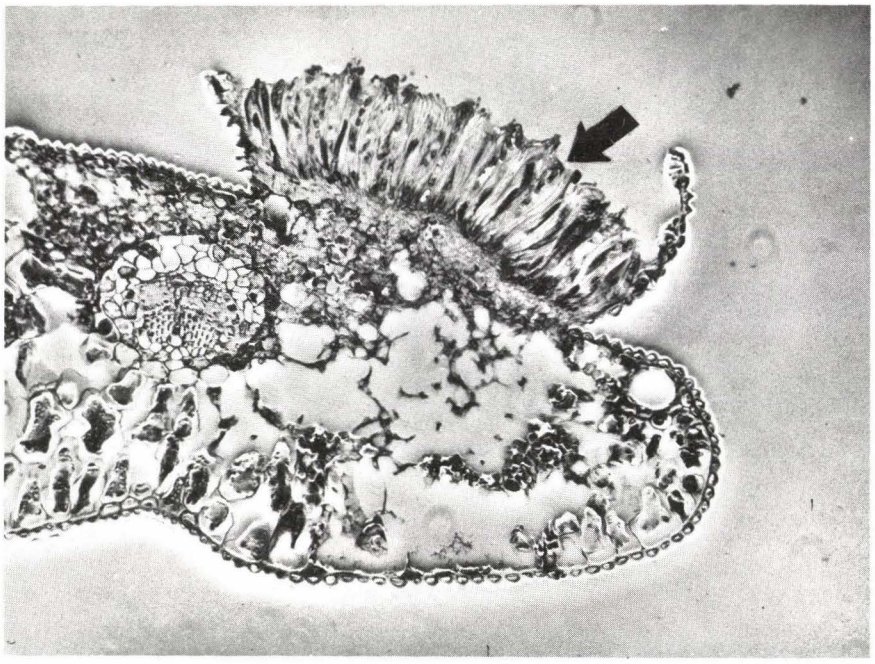

Figure 2.--Cross-section of a fruiting body of Rhabdocline pseudotsugae on a Douglas-fir needle. Note the small spores at the tip of the arrow. Also note the destruction of the mesophyll cells of the needle.

Elytroderma deformans was reported on lowland ponderosa and lodgepole pine in the Region. The most severe conditions were noticed on the Colville and Bitterroot National Forests. The disease causes symptoms that are esthetically unpleasing, thus degrading the appearance of campgrounds in which it has become established.

Hendersonia pinicola was found on the Lolo and Flathead National Forests. Damage was classified as very light. Hendersonia is often found associated with Hypodermella needle cast fungi.

Hypodermella concolor on lodgepole pine was extremely light this year. A small amount was noted on the Gallatin and Lolo National Forests.

Hypodermella laricis was also light, but was found mainly in areas of high larch casebearer concentration. No significant damage was done by this fungus in 1969.

PHYSIOLOGICAL DISEASES

Winter drying, more commonly called "red belt," was severe early in 1969. This disease of conifers caused by warm winds inducing accelerated transpiration rate while the roots are still frozen, was detected on every Forest and nearly every major mountain range. A series of plots were established on Bureau of Indian Affairs land and the Flathead and Gallatin National Forests. Trees, including ponderosa pine, lodgepole pine, whitebark pine, and Douglas-fir, will be observed for recovery and predisposition to disease and insect attacks. Results should be available by September of 1970.

WHITE PINE BLISTER RUST

The known range of white pine blister rust (Cronartium ribicola) was extended to the Wolf Mountains on the Crow Indian Reservation in southeastern Montana. The fungus was found both on Ribes and limber pine (Pinus flexilis). However, the intensity was light when compared to similar stands in northwestern Montana. Blister rust was very severe on the Troy District of the Kootenai Forest and Lightning Creek on the Kaniksu Forest, necessitating salvage logging of pole-sized stands.

AIR POLLUTION DAMAGE

Severe damage, apparently caused by hydrogen fluoride, was observed in the Columbia Falls, Montana, area. Over 3,000 acres of Flathead National Forest land are affected. A comprehensive evaluation is planned for 1970 and 1971. Preliminary data show lethal amounts of fluorine accumulating in conifer needle tissue up to 10 air miles from the plant. Lethal amounts were also found in Glacier National Park. The proposed study will evaluate fluorine accumulation in plants and insects and predisposition by fluorine damage of plants to disease and insect attacks.

Damage in the form of needle tip necrosis and reduced photosynthetic rate of conifers in the Missoula area is becoming more prevalent. Apparently caused by sulfur dioxide from a nearby pulp mill, this environmental disease will be watched closely in the near future.

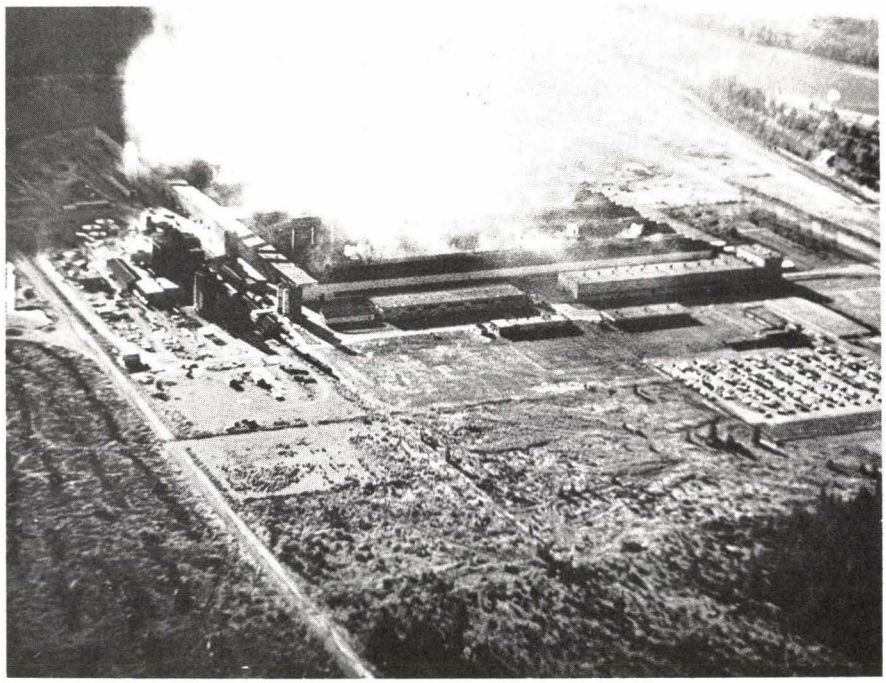

Figure 3.--Aluminum reduction plant at Columbia Falls, Montana. Considerable amounts of hydrogen fluoride and particulate fluorides are released in the effluents of this plant, and are quite toxic in biological systems.

ROOT ROTS

Root rot caused by Fomes annosus in a ponderosa pine plantation on the Colville National Forest was mapped by the plane-table method in 1969. Spread and intensification will be followed in subsequent years. Fomes annosus was found in several stands of ponderosa pine on the Colville and Kaniksu Forests, and likely is present throughout the Region.

Armillaria mellea was noticed Regionwide. No estimate is available of the impact of this organism on timber production, but it probably is quite high. A very large center involving nearly 20 acres of Douglas-fir was discovered on the Flathead Forest near the Seeley-Swan Divide.

MISCELLANEOUS DISEASES

A plantation of Douglas-fir 7 years old was evaluated on the Lolo National Forest near Seeley Lake. Many trees were observed to have dead tops and stunted growth. The primary damage was mechanical, and Cytospora abietis and Plenodomus sp. were found as secondary parasites.

Cephalosporium sp. was associated with cankers on grand fir trees in a plantation near Bigfork, Montana. Mechanical injury had predisposed the trees to attack by the fungus. The disease was classified as not serious.

Verticicladiella sp. was isolated from rotted roots of lodgepole pine on the Coeur d'Alene National Forest. The extent of the disease was not determined.

DISCUSSION

Rarely have forest pathologists been able to reduce timber growth losses caused by disease organisms in mature and overmature stands except by salvage logging. Estimates of disease impact on forest resources are either lacking or grossly in error or both. Lack of manpower and inadequate survey designs stand out as primary reasons for this. In the future, management will be concentrated on young stands because they will compose a large part of the timber resource. Pathologists do not know what the impact of diseases enphytotic in mature natural stands will be on future young stands. Only through coordinated effort by Research, Disease, and Timber Management will we be able to monitor and adjust our management principles to the effects of disease in the future. Impact surveys, properly designed and administered, and selective control measures not adversely affecting the environment must be developed. More than ever, the plant pathologist will be of great importance in the management of timber.